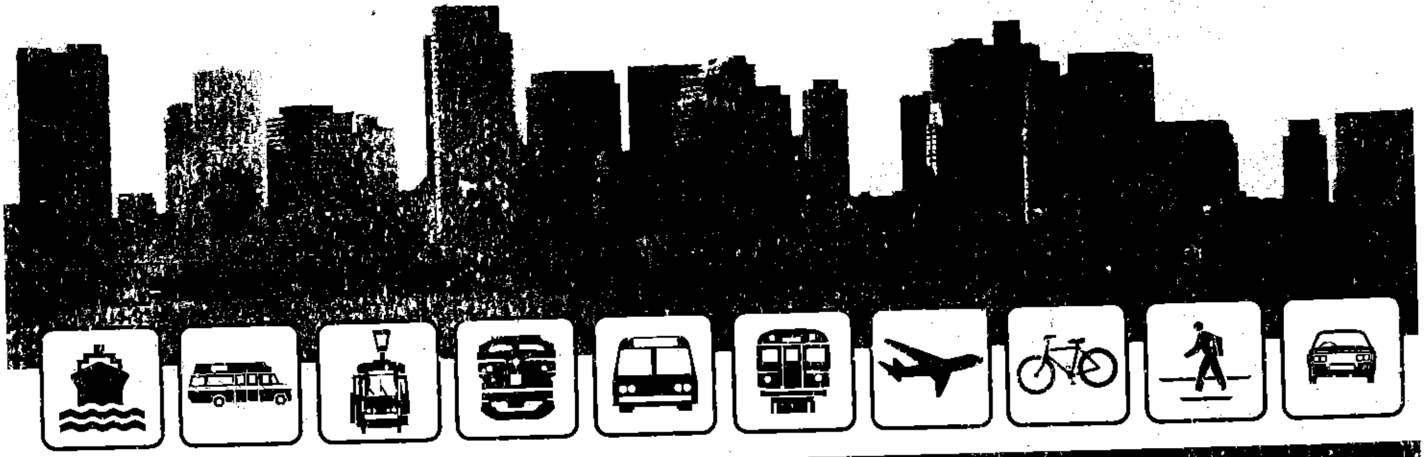
COMMUTING IN A NEW CENTURY



The New Program for Mass Transportation

Executive Summary and Supplemental Information

Executive Office of
Transportation and
Construction
Commonwealth of
Massachusetts

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Executive Office of Transportation and Construction,
Commonwealth of Massachusetts

In cooperation with the
Massachusetts Bay Transportation Authority

In consultation with the
Executive Office of Communities and Development
Massachusetts Bay Transportation Authority Advisory Board
Massachusetts Highway Department
Metropolitan Area Planning Council

With the assistance of the
Central Transportation Planning Staff

Executive Summary

The Program for Mass Transportation (PMT) is the capital program for the Massachusetts Bay Transportation Authority. More specifically, as stated in M.G.L. Chapter 161A, Section 5(g), it is "a long-range plan for the construction, reconstruction or alteration of facilities for mass transportation within the area constituting the authority [MBTA] together with a schedule for the implementation of such plan and comprehensive financial estimates of cost and revenues." The objective of this PMT is *to identify and recommend projects that will result in a cost-effective mass transit system that serves the greatest number of people in a way that respects the environment and enhances responsible economic development.*

This document represents the second major revision to the PMT. It was first prepared in 1966, with a major update in 1978. This new PMT is intended to represent an ongoing program—as new programs, projects, and policies are brought forth, the PMT will be updated through an approved amendment procedure to reflect these changes. Flexibility is also needed in order to accommodate changing economic conditions and new technologies, as well as to respond to funding opportunities and constraints.

The Current Environment

Much of the past planning for public transportation focused on expansion; this emphasis reflected dramatic shifts in population in the post-war period and employment growth that began in the 1970s and continued throughout much of the 1980s. Now, changes in both population and employment have slowed, and for the foreseeable future, the Metropolitan Area Planning Council projects that the region's population and employment will grow at much more moderate rates than in the past (up 1.7 percent and 15.4 percent, respectively between 1990 and 2020). A more stable environment provides an opportunity to satisfy pent-up demand, maintain the existing system in better condition and to plan better for the future.

A second important difference is that funding is more limited now than it has been in the past. The MBTA's four major sources of funding—fares, local assessments, the Federal Transit Administration, and the state—are all constrained. Ridership is sensitive to fares, so that they must be kept at reasonable levels. Federal operating assistance has not increased since 1985. Increases in district assessments have been capped at 2.5 percent per year since the passage of "Proposition 2½" in 1980. As a result, it has been necessary for the state to fund much larger proportions of the MBTA operating deficit than in the past. In addition, the federal share of capital costs has declined over the last decade, increasing the state's share of those costs as well. Reflecting the limitations of state resources, state funding of the capital program has been capped at approximately $300 million per year through FY 1997.

A third difference is that there are now a number of federal and state legal mandates for new MBTA services. Satisfying these mandates by upgrading and expansion of the system is a central purpose of the capital plan in this document. These mandates are:

- The Americans with Disabilities Act (ADA) requires that the MBTA system be made accessible. The estimated cost for ADA compliance is $588 million, not including additional costs built into ongoing projects and future expansion. When these costs are included, the total is estimated to be close to $1 billion.

- The Clean Air Act requires that regional emissions be reduced by 15 percent between 1990 and 1996, and by 3 percent per year between 1996 and 1999. The state must commit to specific projects to attain these reductions in its State Implementation Plan (SIP). A large number of the projects that are in the current SIP and/or that have been forwarded to the EPA as proposed SIP amendments are MBTA projects.

- Service improvements are required by the state Department of Environmental Protection as part of its approval of the Central Artery/Tunnel (CA/T) project. (Many of these are the same projects that are in the SIP.) The estimated cost of MBTA projects in the current SIP, that have been forwarded to the EPA as proposed SIP amendments, and/or are required to mitigate CA/T construction is approximately $2.1 billion.

For further discussion of these issues, see Chapter 2 in the main volume of the PMT.

Regional Commuting Patterns

While Boston and Cambridge remain the region's largest employment centers, the total number of jobs in the suburbs now exceeds the number in Boston and Cambridge. The high rate of growth in employment in the suburbs means that the region's jobs are now more dispersed than ever before. In addition, the area's residents have been moving farther away from their jobs, which has increased travel to a greater extent than the increase in employment.

Transit captures a large share of the market only in places where it offers service comparable to the automobile. In the urban core, the cost of parking often outweighs a car's travel time advantage. For very long distance trips, an express bus is as fast as a car and can be less expensive, especially considering parking costs. Along certain commuter rail lines to the northeast and southwest, automobile travel times are long, making transit very attractive in those corridors.

In the suburbs, transit captures two to four percent of all work trips. Transit in the suburbs is typically less convenient than using a car, and with free parking, there is little incentive not to drive. Commuting to the suburbs is therefore dominated by automobile trips, rather than the multimodal commuting characteristic of the urban core.

Because of differences between the urban core and the suburbs—differences in the nature of development, the total number of jobs, and the amount of travel—transit fills different roles for trips to Boston and Cambridge than in the suburbs.

For further discussion of commuting patterns, see Chapter 3 in the main volume of the PMT.

The Role of Transit and Future Strategies

For the future, public transit is expected to serve six major roles in the future transportation environment of eastern Massachusetts. An increase in transit capacity will be necessary to **accommodate and serve future job growth in the core area.** At the present time, all major highways and most rail services to downtown Boston are at or near capacity during peak periods. The Central Artery/Third Harbor Tunnel project will remove a major bottleneck and increase capacity, but radial highway capacity to the core will continue to be limited. Therefore, additional work trips to the core area will need to be carried on transit and other forms of high occupancy transport such as vanpools.

The state and the region are now developing congestion and incident management plans in order to **manage traffic congestion.** The transit system is crucially important in reducing the burden on the highway system and will continue to play that role in the future.

No single mode can satisfy a region's wide range of mobility needs. Transit offers an opportunity to **provide better travel options** . Expanding service in areas that can be served effectively by transit will allow people to choose the most efficient means of travel. In addition many people cannot drive a car due to age or disability, or do not have a car available. For these people, transit service is essential for mobility.

An increased use of public transit can **make more land available for other uses** such as housing, commerce, and recreation because public transit facilities require significantly less land than facilities for automobiles. A reduction in the need to accommodate cars also makes it possible to design street spaces at a more human scale, improving the pedestrian environment and making the region more "livable."

Transit system enhancement will play a significant role in the region's effort **to improve air quality.** Increased use of public transit results in cleaner air by shifting travelers out of single-occupancy automobiles. Also, mass transportation facilities can encourage a higher density of development, especially along major transit corridors. This, in turn, can lead to more trips made by transit and walking, which improves air quality and reduces traffic congestion and energy consumption.

When transit is operated effectively and is well utilized, it can transport people with greater energy efficiency than automobiles and thus **reduce energy consumption.** While there are no shortages of gasoline at this time and none are expected in the short-term, it is prudent to make our energy resources last as long as possible.

For trips to, from, and within the core area the emphasis should be on providing services that are more attractive and that will improve access to the core for the entire region. There are several strategies that will help accomplish this goal:

- Use existing facilities more effectively - by matching service levels to demand.
- Make transit service faster.
- Provide better access to transit - especially by expanding park and ride facilities.
- Fill gaps in service.
- Provide more efficient transit connections.
- Direct mass transportation improvements to areas that are severely congested.
- Expand capacity to meet existing and projected demand.

For trips within the suburbs, the short-term emphasis will be more on providing a basic level of mobility. Higher-level services will be targeted toward serving more densely developed suburbs, and areas where transit service could relieve congestion. This emphasis reflects the historical difficulties in providing transit in the suburbs.

For further discussion of these issues, see Chapter 4 in the main volume of the PMT.

Program Development Process

To initiate the PMT development process, a series of public "transportation town meetings" was held throughout the region to solicit community and public input. This effort resulted in a large and diverse array of potential improvements (as documented in the Phase 1 report "Initial Study of Suggested Transportation Improvements").

A preliminary screening of each of those projects was conducted in Phase 2 to determine which projects warranted more detailed analysis. The screening was based on:

- consistency with regional, and local transportation goals, policies, and objectives.
- consistency with the intent of Intermodal Surface Transportation Efficiency Act (ISTEA) and the Clean Air Act Amendments of 1991.
- the judgments of the agency representatives that served as the PMT Update's "working committee."

This effort led to the selection of over 70 projects that were examined in detail in Phase 3. The examination of projects consisted of the estimation of ridership, operating and capital costs, fare revenue, traffic impacts, and air quality benefits. Each project was then evaluated based on estimated utilization, cost-effectiveness, and a number of financial, air quality and other impacts. Based on the need to fulfill SIP and CA/T requirements, the most important of these considerations were the number of new transit trips that would be generated, air quality impacts, operating costs and revenues, and the capital cost per new transit rider.

A detailed description of all projects studied in Phase 3—both recommended and not recommended—including ridership, operating and capital costs, fare revenue, traffic impacts, air quality benefits, and associated performance measures, is provided in Appendix G in volume two of the PMT.

Recommended Program

This section presents the recommended program for mass transportation improvements through the year 2020. Details on specific projects are presented in Chapters 6 through 9 of the main volume of the PMT. Major elements of the program are as follows:

1. **Preservation of the Existing System**
   The top priority is to ensure that the existing system is preserved. Over the past decade and continuing today, a large portion of MBTA capital resources have been used to correct problems of past deferred maintenance. Deferred maintenance expenditures, which are often significantly more costly than those for preventive maintenance, results in less funding for new services. By properly maintaining the system, more future funds can be directed toward improving service and relieving congestion.

2. **Accessibility Improvements (ADA-Related Projects)**
   After maintenance of the system, the focus of the PMT will be on projects to make the system accessible as required by the Americans with Disabilities Act (ADA). The MBTA has filed a Key Station Plan which it will carry out over the coming years to comply with ADA. The accessibility improvements will have benefits for able-bodied users of the system as well.

3. **SIP and CA/T Mitigation Service Expansion Projects**
   The projects that will be most effective for Clean Air Act and CA/T mitigation purposes will be those that divert the most trips from automobiles. Transit is most successful in congested corridors, and most projects that create a large number of automobile trip diversions will also provide traffic congestion relief.

4. **Additional Expansion**
   In addition to meeting ADA, Clean Air Act, and CA/T Mitigation requirements, a number of other expansion projects are recommended. However, because of the time and cost that will be required to meet regulatory mandates, all of these projects are subject to available funding, and most would be implemented after the short-term.

Projects are categorized as short-term or long-term. Short-term is considered to be through the year 2000; long-term is between 2001 and 2020. ADA, SIP, and CA/T Mitigation projects have implementation deadlines. These projects have been placed in the short and long-term categories based on those deadlines. Additional expansion projects have been placed in one of the two categories based on estimated funding availability (as described below and in Chapter 10 of the main volume), project benefits, and estimates of the time required for implementation.

Summary of Recommended Program

Table ES-1 below presents a summary of the capital costs for the recommended projects. This summary of costs includes all projects that were found to have merit in the PMT analysis. Most, if not all, of these projects must undergo further analysis before they are implemented; under closer scrutiny, some of them may not prove out. The funding and implementation of this program are discussed in the next section and in more detail in Chapter 10 of the main volume.

Table ES-1
Summary of Capital Costs of Recommended Program
(All figures in 1993 dollars)

	Short-Term (1994-2000)	Long-Term (2001-2020)
	Total Cost	Total Cost
Category		
Preservation of Existing System	$1,700m	$6,000m
ADA-Related Projects	$266m	$322m
SIP and CA/T Mitigation	$1,311m	$282m
Additional Expansion	$254m	$6,004m
TOTAL	$3,531m	$12,608m

Preservation of the Existing System

According to "Building for Tomorrow: The MBTA's Capital Program FY93-FY97," published in November, 1992, the total replacement value of the MBTA system exceeds $7 billion. Based on the expected useful life of the individual components of the system, it would cost an average of $303 million per year to replace the existing system.

On a year-to-year basis, actual costs are likely to be significantly higher or lower. This is because the life-cycle costing estimates assume that a few of each type of asset would be replaced each year. In reality, needs for an individual year depend on original construction or purchase dates, and many types of purchases, such as vehicles, are combined to take advantage of economies of scale. Also, the life-cycle estimate does not include the cost of deferred maintenance that has not yet been remedied.

For the period FY 1993 to FY 1997, the MBTA has identified "infrastructure reinvestments" that total $1.22 billion. This represents an average annual expenditure of $244 million. Major projects include a new Boston Engine Terminal ($92 million in the FY93–FY97 time frame), Blue Line station modernization ($238 million), Red Line vehicle procurement ($118 million) and systemwide fare collection equipment ($100 million). (For the complete list of projects for the period FY 1993 to FY 1997, see Table S1-2 in this volume). Beyond 1997, most individual maintenance projects have not yet been selected.

ADA-Related Projects

To meet ADA requirements, the MBTA will need to spend approximately $1 billion over the next 20 years. Many of these costs will be included within the cost of other projects (such as Blue Line Modernization and new service projects). However, a large portion of these costs will be reflected in projects specifically intended to make the system accessible. These costs are listed in Table ES-2.

Table ES-2
ADA-Related Capital Costs
(All figures in 1993 dollars)

	Total Cost	FY 1993-FY 1997	Beyond FY 1997
Key Station Plan	$242.9m	$42.5m	$200.4m
Other Red Line Access	$3.6m	$3.6m	$0.0m
Other Orange Line Access	$11.8m	$9.7m	$2.1m
Commuter Rail Accessibility	$2.7m	$2.7m	$0.0m
Green Line Vehicles	$319.5m	$105.8m	$213.7m
RIDE Vehicles	$1.8m	$0.8m	$1.0m
Misc	$5.6m	$0.4m	$5.2m
Total	$587.9m	$165.5m	$422.4m

Note: Blue Line accessibility costs are included in the Blue Line Modernization project, and all bus accessibility costs are included in the purchase of new buses.

SIP and CA/T Mitigation Service Expansion Projects

Nearly all of the SIP and CA/T projects have merit in terms of new ridership, VMT reduction, cost-effectiveness, and air quality benefits. With the possible exception of four projects—Green Line Arborway restoration, 400 buses, Newburyport commuter rail service, and two commuter boat facilities—and assuming that sufficient funding is available, all are worthy of implementation consistent with SIP and CA/T mitigation requirements.[1]

The estimated cost of implementing SIP and CA/T Mitigation service expansion projects,[2] without substitutions, is at least $1.6 billion (see Table ES-3). With substitutions, costs would be lower.

Table ES-3
SIP and CA/T Mitigation Service Expansion Projects (without substitutions)
(All figures in 1993 dollars)

	SIP	CA/T Mitigation	Capital Cost
Short-Term			
Old Colony Commuter Rail Restoration			
Plymouth and Middleborough Lines (underway)	√	√	$480.0m
Greenbush Line	√	√	$80.0m
Worcester Commuter Rail Extension	√	√	$119.0m
South Boston Piers Transitway	√	√	$355.9m
Washington Street Replacement Service		√	$40.0m
400 Buses		√	$88.0m
10,000 Additional Parking Spaces by 12/31/96	√	√	$0.0m[3]
10,000 Additional Parking Spaces by 12/31/99	√	√	$107.0m
Newburyport Commuter Rail Extension	√	√	$42.8m
2 Commuter Boat Facilities		√	TBD
Subtotal Short-Term			$1,312.7m+
Long-Term			
Green Line Extension to Medford Hillside	√	√	$88.0m
Blue Line - Red Line Connector	√	√	$137.5m
Arborway Restoration/Replacement	√		$56.6m
Subtotal Long-Term			$282.1m
Total: Short-Term + Long-Term			$1,594.8m+

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[1] If a SIP or CA/T Mitigation project is found to be infeasible for cost or other reasons, another project that would provide similar ridership and air quality benefits can be substituted. This PMT identifies possible candidates for substitution, but these substitute projects are not being recommended at this time.

[2] Not all SIP and CA/T Mitigation projects are service expansion projects. Two required projects—new Red Line vehicles and new Orange Line vehicles—are included under the category of Preservation of the Existing System.

[3] The commitment to add 10,000 spaces by 1996 can be met through a combination of spaces recently completed (1,650), and parking at new stations on the Middleborough and Plymouth Old Colony lines (6,630) and the Worcester extension (2,500). The costs for these spaces are included within the costs of Old Colony and Worcester extension projects.

Additional Expansion

System expansion would attract new transit riders as well as meet future travel demand. However, due to the high cost of preserving the existing system, meeting ADA requirements, and implementing SIP and CA/T Mitigation projects, the availability of funding that would be necessary for additional expansion is uncertain. This is especially true in the short-term.

Projects that would generate the highest number of new transit trips and be the most cost-effective in attracting new ridership and improving air quality are recommended as "Additional Expansion" projects, with implementation subject to funding limitations. Projects in this category would provide varying levels of benefits. To reflect this, these projects, which are listed in Table ES-4, are presented in three categories:

Short-Term This category contains lower cost projects that could be implemented by 2000. Other than additional park and ride expansion, which is a compilation of a large number of small projects, the costs of these projects are each below $50 million. Most of these capital costs are for equipment purchases and parking construction, both of which can be accomplished relatively easily in the short run. The total cost of all projects in this category would be $254 million.

Long-Term Tier 1 This category generally contains the projects that have the potential to provide the greatest increases in transit ridership. Three of these projects—the North Station - South Station Rail Link, Inner Circumferential Transit, and an extension of the South Boston Piers Transitway—are among the most expensive in the PMT. Most projects in this category would require a full environmental review. Circumferential Transit would also require further study of alignment, technology, and costs. It is appropriate that these projects be considered as long-term projects because of the amount of time needed to complete the required environmental processes and the need to identify funding. The total cost of projects in the Long-Term Tier 1 category would be $5.3 billion.

Long-Term Tier 2 Projects that are included in this category ranked moderately well in terms of ridership, cost, cost-effectiveness relative to other projects, but not as well as those described as higher priority projects. The total cost of these projects would be at least $700 million.

Most of these projects have only gone through preliminary analysis as part of the PMT. Further analysis is needed to determine feasibility, environmental impacts and design. Changes in future conditions in the region can also have an impact on the effectiveness of projects. Investments which appear to be desirable now may be less desirable fifteen years from now due to unforeseen developments in the region. Finally, the availability of future funding is uncertain; it may not be possible to carry out all desirable projects because of limitations on funding.

Table ES-4
Additional Expansion Projects
(All figures in 1993 dollars)

	Capital Cost
Short-Term	
Commuter Rail Express Service	
Rockport/Ipswich Line	$18.6m
Haverhill/Reading Line	$39.1m
Lowell Line	$17.1m
Franklin Line	$45.8m
Attleboro/Stoughton Line	$20.8m
Inner Circumferential Bus Service	$2.3m
Expansion of Existing Park & Ride Lots (beyond SIP & CA/T requirements)	$60.4m
New Park and Ride Lots on Express Bus Routes	$2.6m
Intercept Stations along Major Highways	$30.1m
New/ Improved Express Bus Services (Newton, Waltham, Burlington, Lynnfield)	$11.0m
Better Downtown Boston Bus Distribution	$6.1m
Total Short-Term	$253.9m
Long-Term Tier 1	
Expansion of Existing Park & Ride Lots (beyond SIP & CA/T requirements)	$51.2m
Intercept Stations along Major Highways	$30.1m
Rockport/Ipswich Commuter Rail/Blue Line Connection	$9.3m
Inner Circumferential Transit Line	$1,400.0m
South Boston Piers: South Station to Boylston	$180.0m
North Station - South Station Rail Link	$3,633.0m
Needham Commuter Rail Improvements/New Stations	TBD
Green Line Improvements	TBD
Subtotal Long-Term Tier 1	$5,303.6m+
Long-Term Tier 2	
Blue Line Extension to Lynn	$275.0m
Red Line Extension to Mattapan	$54.8m
New Bedford/Fall River Commuter Rail Service	$288.0m
Millis Commuter Rail Service	$66.7m
Fairmount Commuter Rail/Red Line Connection	$8.2m
New Connections to Logan Airport	TBD
Route 128 Bus Service	$7.9m
Subtotal Long-Term Tier 2	$700.6m+
Total Long-Term + Short-Term	$6,258.1m+

Figures ES-1 through ES-4 on the following four pages present a visual display of the recommended program by time period and geographical area. Not all of the projects could be easily represented on the maps, especially the infrastructure reinvestment projects and vehicle purchases. The figures, though, give some idea of what the MBTA system could look like in the year 2020, if the program were fully funded.

Figure ES-1
Short-Term Program: Urban Core

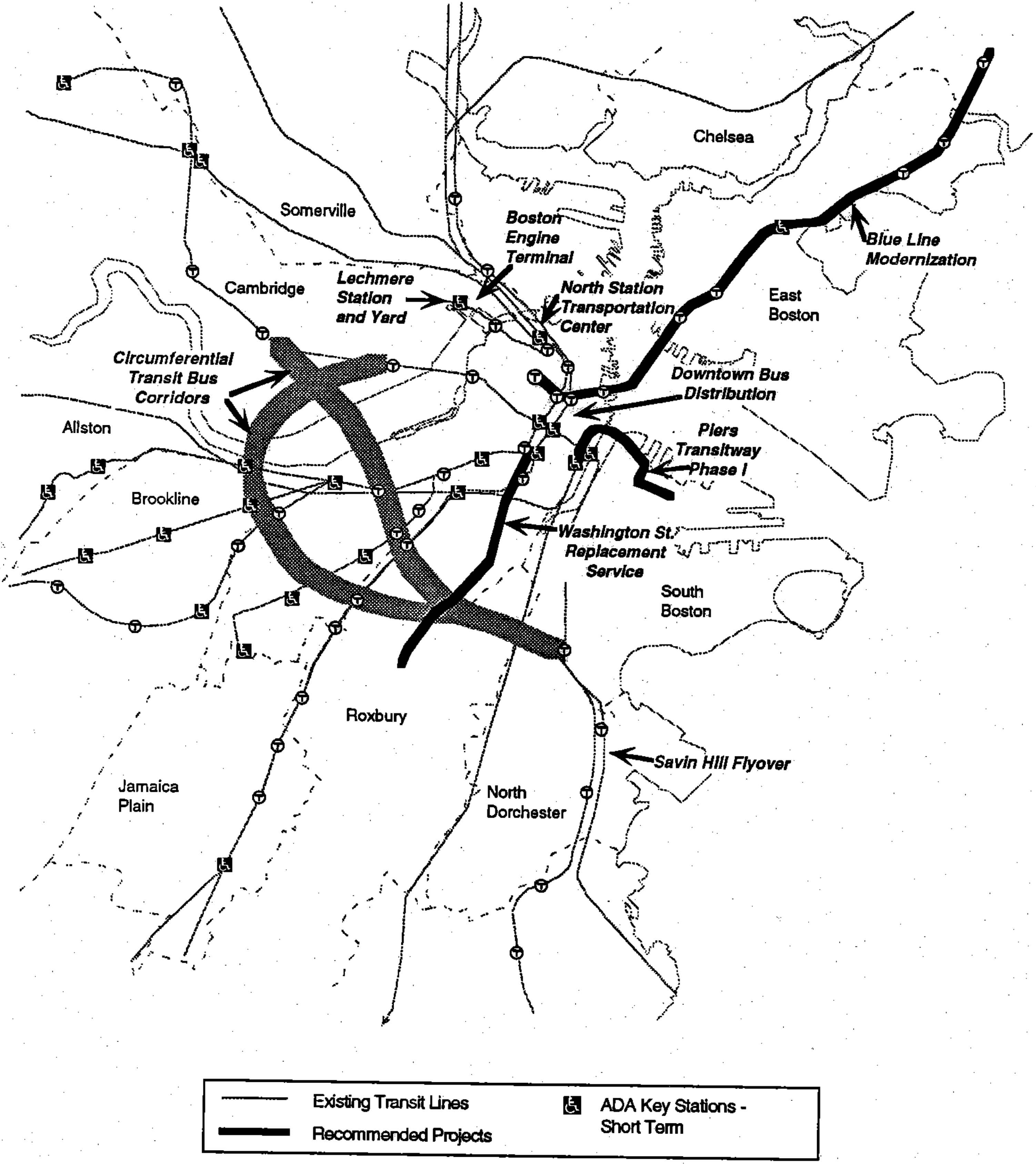


Figure ES-2
Short-Term Program: Outer Areas

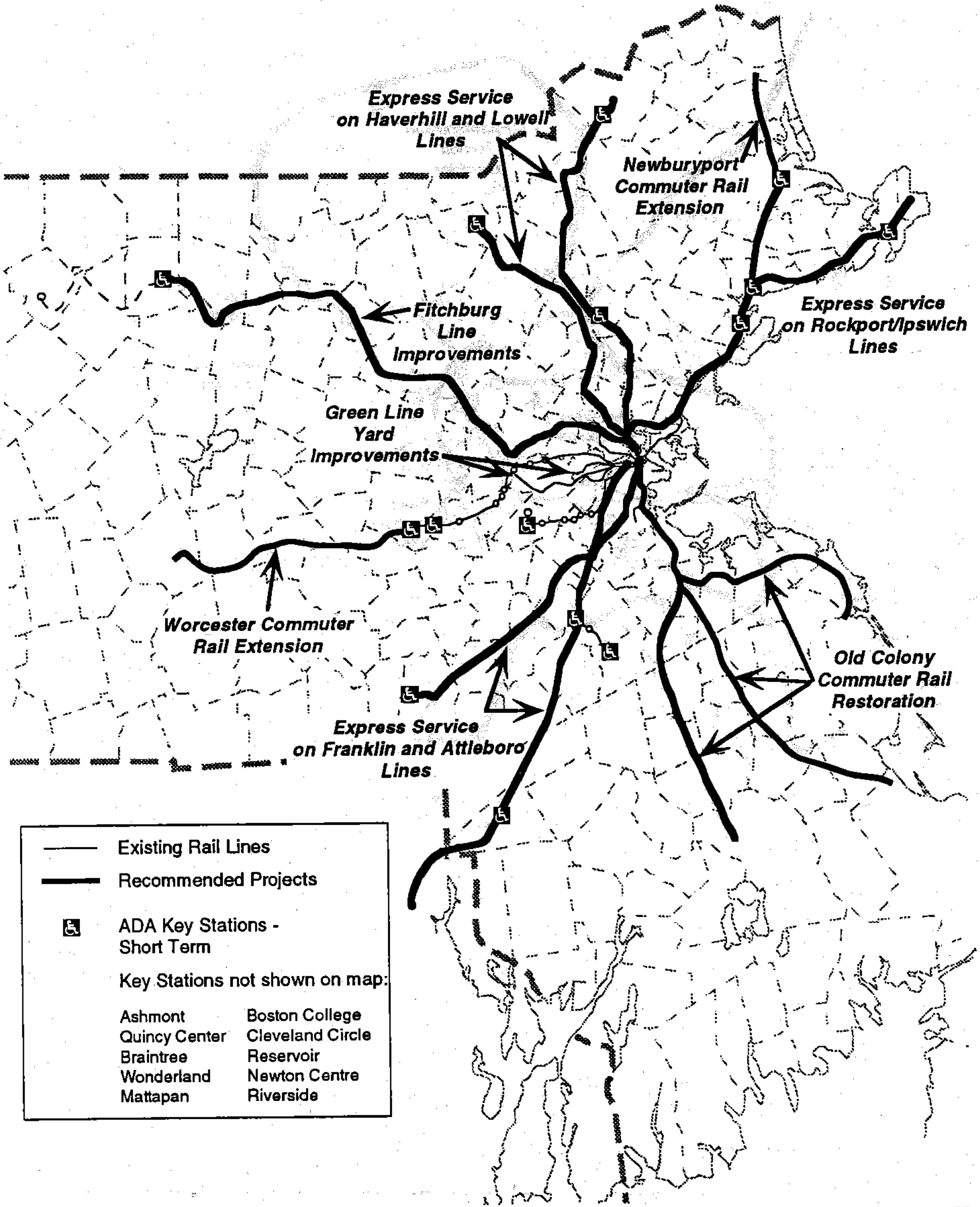

Express Service on Haverhill and Lowell Lines
Newburyport Commuter Rail Extension
Fitchburg Line Improvements
Express Service on Rockport/Ipswich Lines
Green Line Yard Improvements
Worcester Commuter Rail Extension
Old Colony Commuter Rail Restoration
Express Service on Franklin and Attleboro Lines
Existing Rail Lines
Recommended Projects
ADA Key Stations - Short Term
Key Stations not shown on map:
Ashmont
Quincy Center
Braintree
Wonderland
Mattapan
Boston College
Cleveland Circle
Reservoir
Newton Centre
Riverside

Figure ES-3
Long-Term Program: Urban Core
(Tiers 1 and 2 combined)

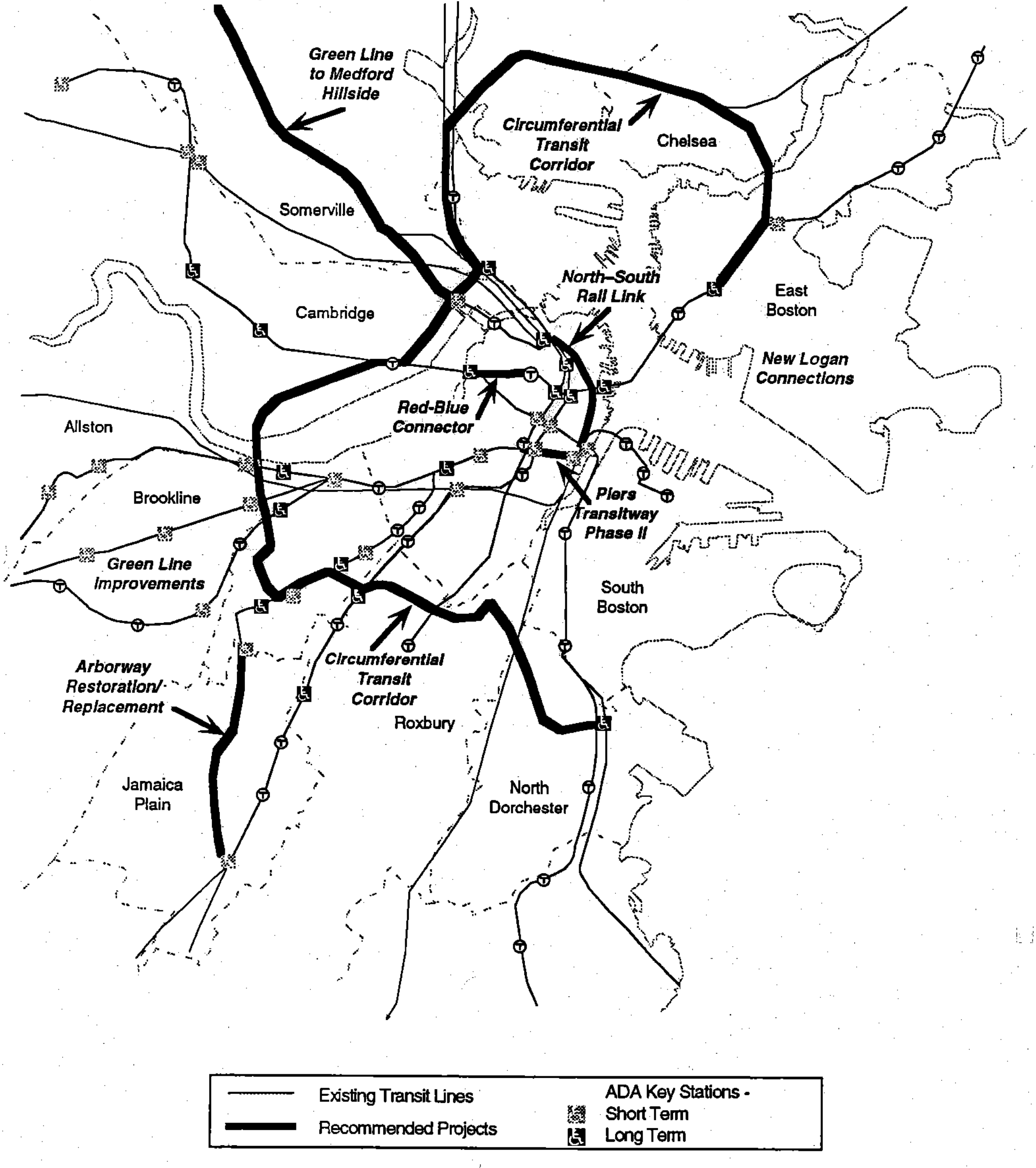
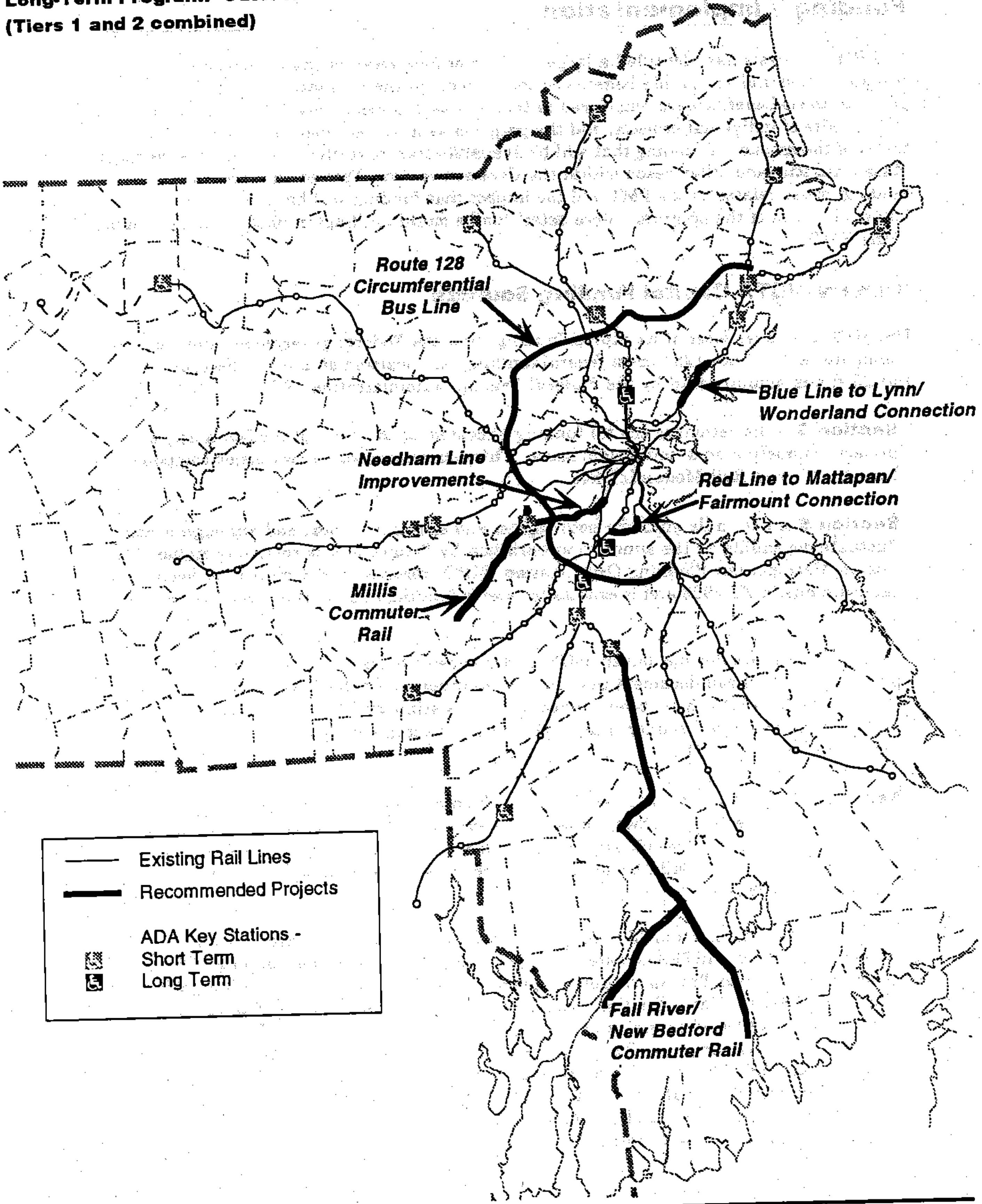


Figure ES-4
Long-Term Program: Outer Areas
(Tiers 1 and 2 combined)



Funding / Implementation

The PMT analysis has identified a large number of new services that could provide transportation and air quality benefits to the region. In the evaluation of individual projects, these benefits were considered in terms of each project's costs. On a broader level, the benefits of individual projects, and the program as a whole, must be considered in terms of the amount of funding that will be available, transportation needs in other parts of Massachusetts, and other needs within the Commonwealth. This section addresses funding issues related to the PMT and the impact that funding will have on implementation of the program. More detail can be found in Chapter 10 of the main volume of the PMT.

Primary MBTA Capital Funding Sources

The MBTA receives most of its capital funding from the Federal government and from the Commonwealth. Since 1987, most federal funding has consisted of a mix of Section 3, 9 and 23 funds administered by the Federal Transit Administration (FTA):

Section 3 is discretionary capital funding allocated on the basis of project merit, with projects competing on a nationwide basis. This source consists of two major components, New Starts and Rail Modernization.

Section 9 is a formula grant for both capital and operating funds, and although it can fluctuate depending on the annual appropriation by Congress, it is relatively stable. The Boston Metropolitan Planning Organization (MPO) received $26.6 million in Section 9 capital funds in FY 1993 and it expects to receive funding at a similar level for the near-term future.

Section 9 funds are flexible, but the MPO is not allowed to transfer these funds to highway purposes unless it can document that all the requirements of the Americans with Disabilities Act (ADA) have been carried out. This stipulation virtually guarantees that Section 9 funds will be used for transit, because of the large investment needed to satisfy the conditions of the ADA.

Section 23 is interstate transfer funding, which consists of funding initially earmarked for interstate highway projects but subsequently transferred to transit projects, including the Alewife extension and the new Orange Line. This source will expire in FY 1994. The MBTA had previously received up to $120 million from this source (in FY 1987).

In addition to Section 3, 9 and 23 funding, the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) created two new categories of "flexible" funding. These categories are Surface Transportation Program, or "STP", and Congestion Mitigation/Air Quality, or "CMAQ." These funding categories are administered by the Federal Highway Administration, but based on action by MPOs, can be transferred to the FTA for distribution for transit projects. The Boston MPO has acted to transfer between $28 and $37 million per year in flexible funds to the MBTA for FYs 1992 through 1995. It has been established, in principle, that additional funds be transferred in FYs 1996 and 1997. However, beyond committed funds, MBTA needs will have to be considered with highway needs for available flexible funding.

State capital funding is largely in the form of bond revenues. The sale of bonds by the MBTA is authorized by the state, with subsequent repayment funded by the state through the MBTA's operating budget.

Expected Future Funding

Over time, federal discretionary funding has tended to be distributed in a manner that provides a degree of equity throughout the nation. As a result, years with relatively low receipts are often preceded and succeeded by years with relatively high receipts. Therefore, rather than attempt to forecast future funding on a year by year basis, past trends have been used to develop "average annual" figures that can be used as an indication of potential future funding levels over time:

Federal Section 3, 9, and 23 Funding

When measured in 1993 dollars, the total average annual amount of FTA funding that the MBTA has received, or expects to receive, is essentially the same under ISTEA as it was under its predecessor the Surface Transportation and Uniform Relocation Assistance Act (STURAA), at $137 million to $143 million:

	STURAA (FY87 - FY91)	ISTEA (FY92 - FY97)
Low	$81m	$95m
High	$182m	$190m
Average	$137m	$143m

Federal Flexible Funds

The transfer of STP and CMAQ flexible funds were made specifically for the South Station Bus Terminal and Old Colony projects and range from $28 to $37 million between FY 1992 and FY 1997. In future years, both transit projects and highway projects will be eligible for these funds. Since highway needs have not been fully developed at this time, it is not possible to predict the relative needs of future transit and highway projects. Therefore, the amount of potential future flexible funds cannot be reasonably projected at this time.[4]

State Bond Funding

The cap imposed on state bond funds means that the amount of state money available for transit will decline over time in real terms. Up to the present time, the MBTA has not reached the cap in any year, and the FY1993 bond sale of $185.4 million was well below the authorized limit. Through FY 1997, the $300 million figure is retained as the maximum available state funds per year. For the period FY 1993 to FY 1997, the $1.5 billion dollar bond cap represents average annual funding in 1993 dollars of $280 million.

Over the period FY 1992 to FY 1997, the MBTA has received, or can reasonably expect to receive, an average of $143 million per year in FTA funding, and an average of $280 million in state bond funds. In total, this represents an average of $423 million per year available in dedicated transit funding. Any flexible funding would be in addition to this amount.

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[4] For additional information on highway needs and broader information on funding issues as they pertain to both highways and transit, refer to "The Transportation Plan for the Boston Region," November 1993, produced by CTPS for the Boston MPO.

PMT Costs versus Expected Capital Funding

Capital costs associated with MBTA service typically vary significantly from year-to-year. The variation is typically associated with the types of infrastructure reinvestment projects required (as described in Chapter 6 in the main volume) and the type and scope of expansion projects that are being undertaken. For the future, the MBTA will have some degree of flexibility in the phasing of projects to match funding availability. Significant exceptions are the ADA-related projects and SIP and CA/T Mitigation projects, most of which have implementation deadlines.

Because most of the projects which the PMT recommends as desirable still need to undergo environmental review, it is premature to attempt to forecast implementation timeframes on a year-to-year basis far into the future. In recognition of this, and that there will be flexibility in the phasing of most projects, costs and funding have been examined on the basis of average annual costs and average annual funding availability for the short-term (through 2000) and for the long-term (2001 to 2020).

As described above, the first priority of the PMT is to ensure preservation of the existing system. Next, the highest priorities are to make the system accessible and to meet SIP and CA/T Mitigation requirements. The implementation of projects in these three categories will require average annual expenditures of $468 million. The actual expenditures will vary significantly from year to year, depending on the rates of progress of the various projects that are underway.

Over the longer-term, as the system is made accessible and SIP and CA/T Mitigation requirements are met, costs to preserve the existing system and other mandated expenses will be significantly lower (at approximately $330 million per year) which should leave funding available for additional expansion. However, the cost of all the Additional Expansion projects, averaging $300 million per year, would exceed the amount of funding that has been available in prior years.

Reconciling Costs with Available Funding

For the PMT to be a responsible program, it must be implemented within the constraints of available funding. The total cost of the projects included in the recommended program exceeds the amount of capital funding that can now be conservatively identified. This is not intended to imply that more money will be made available or that all the recommended projects will prove out. Some issues will need to be resolved as this program is carried forward, including the following:

- The amount of future federal funding cannot be predicted with any degree of certainty, but it might be higher in the future than it has been in the past. At this time, it appears that a large federal grant would be sought to fund the Rail Link, and that funding under the Section 3 New Start (or similar) program would have to be pursued for the Inner Circumferential Transit project.

- While the PMT analysis examined all projects on the basis of ridership, cost, traffic, and air quality characteristics, most projects would still need to undergo significantly more detailed environmental review before they could be implemented. It is likely that some of the projects would have environmental and/or community impacts that would make them less desirable than they now appear, and thus will not be implemented. This would reduce the size of the program.

- The MBTA's transit needs, as presented in this PMT, still need to be examined relative to the state's highways needs. This multimodal analysis, which will be conducted in the context of the ISTEA metropolitan and statewide long-range plans supported by the management systems will determine the amount of flexible funding that may be available. The figures presented above for the long-term do not assume any allocation of flexible funding to transit projects; such an allocation would increase the size of the transit program that could be implemented.
- Substitutions for some SIP and CA/T Mitigation projects may be desirable. As described earlier, the SIP and CA/T Mitigation projects that were examined in the PMT analysis have merit in terms of ridership and/or air quality benefits. However, some of those projects do not represent the most cost-effective way to achieve those benefits. Substitutions may allow for the implementation of some of the short-term additional expansion projects.
- This PMT addressed needs over a 27 year period that extends to 2020. This analysis was based on current projections of growth and land use through that time. Changes will occur during this period that cannot be predicted, which may alter the effectiveness of some projects. These types of changes could either increase or reduce needs.

The inclusion of a larger number of projects in the recommended program than can likely be funded is intended to provide flexibility to respond to future demands placed on the transportation system. On a year-to-year basis, or for any given period of years, it will be necessary to implement the most effective projects within the limits of the amount of funding that will be available.

Finally, it should once again be noted that the PMT is one part of an ongoing planning process that includes the development of regional and state Transportation Plans and ISTEA management plans. It is likely that the development of these plans will lead to further refinements to the PMT.

Schedule for Implementation

Figure ES-5 provides a timeline up to the year 2020, showing in which five-year period the recommended PMT projects may be completed. Scheduling projects ten to thirty years in the future is tentative at best. This timeline is therefore presented to give the reader a sense of the extent of the transit system at five-year intervals.

Additional information on project scheduling is provided in Chapter 10 of the main volume and Supplement 1 in this volume.

Figure ES-5

Projected Timeline of PMT Projects

1994–2000

- Old Colony Commuter Rail - 3 branches
- Worcester Commuter Rail
- South Boston Transitway - So. Sta. to WTC
- Washington Street Replacement Service
- Inner Circumferential Bus Service
- Newburyport Commuter Rail
- Express Service on Commuter Rail lines
- Expansion of Park and Ride
- New Express Bus
- Better Downtown Bus Distribution
- Key Station Plan
- Other Accessibility
- Blue Line Modernization
- North Station Transportation Center
- South Station Bus Terminal
- Boston Engine Terminal
- Fare Collection Equipment
- Red Line Vehicles
- Orange Line Vehicles
- Green Line Vehicles
- Commuter Rail Vehicles
- Bus Replacement
- RIDE Vehicles
- Other Infrastructure Reinvestment

2001–2005

- South Boston Transitway - South Station to Boylston
- Arborway Restoration/Replacement
- Rockport/Ipswich Commuter Rail/Blue Line Connection
- North Station–South Station Rail Link Phase 1
- Needham Commuter Rail Improvements/New Stations
- Green Line Improvements
- Route 128 Bus Service
- Expansion of Park and Ride
- Accessibility
- Red Line Vehicles
- Green Line Vehicles
- Commuter Rail Vehicles
- Bus Replacement
- RIDE Vehicles
- Other Infrastructure Reinvestment

2006–2010

- Red–Blue Connector
- Green Line to Medford Hillside
- Blue Line Extension to Lynn
- New Bedford/Fall River Commuter Rail Service
- New Connections to Logan Airport
- Expansion of Park and Ride
- Accessibility
- Red Line Vehicles
- Orange Line Vehicles
- Blue Line Vehicles
- Green Line Vehicles
- Commuter Rail Vehicles
- Bus Replacement
- RIDE Vehicles
- Other Infrastructure Reinvestment

2011–2015

- Inner Circumferential Transit Line
- Red Line to Mattapan
- Commuter Rail to Millis
- Commuter Rail Vehicles
- Accessibility
- Bus Replacement
- RIDE Vehicles
- Other Infrastructure Reinvestment

2016–2020

- North Station - South Station Rail Link Phase 2
- Fairmount Commuter Rail/Red Line Connection
- Commuter Rail Vehicles
- Bus Replacement
- RIDE Vehicles
- Other Infrastructure Reinvestment

Supplement 1
Implementation Schedule

Table S1-1 following this introduction provides a construction and implementation schedule for the projects in the PMT through the year 2000. Spending is broken out by fiscal year according to the MBTA's Five-Year Capital Program through FY 1998. Spending for years beyond FY 1998 was drawn from other sources (such as the MBTA Key Station Plan). Additional detail on each line item in this table is available in the main volume of the PMT in Chapters 5 through 9. Table S1-2 provides a detailed listing of all of the projects in the Infrastructure Reinvestment category.

It is not possible to fill in every cell on Table S1-1 due to the uncertain nature of future funding. As mentioned in Chapter 10 of the PMT, the total cost of all the projects included in the program exceeds the amount of funding that is likely to be available. Inclusion in the PMT does not guarantee construction; it only makes it possible under the MBTA's enabling statute. Some of the projects for which spending has not been identified may be delayed past the short-term period (1993-2000).

The MBTA is not able to make a final decision on whether to proceed with a project until it is able to identify funding for it. Through 1998, the MBTA has fully programmed the funds it expects to have available, and all of the spending shown in the table represents funding that the MBTA has identified. Construction of additional projects in this time frame would entail acquiring additional funds from the state or federal government or delaying one of the currently programmed projects.

In a few of the years shown on the table, especially 1995 and 1996, projected spending exceeds the *average* amount of funding expected, as discussed in Chapter 10. In other years, spending is below average. Years in which spending is below average, such as 1993 and 1994, allow spending to rise above average in following years.

Several cells in the table are "grayed," indicating that a final funding decision has not yet been made. Explanations for these areas are as follows:

- Infrastructure Reinvestment - There will certainly be projects in this category beyond 1998, but they have not yet been programmed. (Additional projects for 1998 are likely as well.) The $301 million bottom-line figure for 1999 and 2000 is the average amount spent over the preceding five years and is a place holder for expected expenditures in those years.

- SIP-CA/T Mitigation Projects - As discussed in Chapter 8, decisions on four of these projects have not yet been made. It is possible that substitutions will be made for one or more of them, as permitted by state regulations. Given this uncertainty, it is not possible to set out a construction schedule for these four projects.

- Additional Expansion - As discussed in Chapters 9 and 10 of the PMT, these projects were found to be very desirable for short-term implementation, but it is uncertain whether funding will be available. Some of them may be used as substitutions for SIP-CA/T mitigation projects. Because no final decision has been made to proceed on these projects, it is not possible to provide a spending schedule.

As spending on SIP-CA/T Mitigation projects subsides toward the end of this decade, other projects, including the Additional Expansion projects, can be brought into the short-term capital program.

Note that there are some minor discrepancies between the total project costs shown on Table S1-1 and those contained in the PMT. Table S1-1 is consistent with the most recent version of the MBTA Capital Program, while figures in the PMT were drawn from a previous version. The differences are as follows:

- RIDE Vehicles: The PMT listed a capital cost of $1.8 million (page ES-6), but the revised Capital Program has budgeted $3.8 million.

- Worcester Commuter Rail Extension: The PMT's total cost for this project is $119 million (page ES-7) with a construction cost of $80 million and a vehicle cost of $39 million. In the Capital Program (and on Table S1-1), the vehicles are included in the Commuter Rail Infrastructure Reinvestment line item, leaving only the $80 million construction expense in the Worcester extension line item.

- Washington Street Replacement: The PMT's cost estimate of $40 million has been updated to be consistent with the Capital Program's current estimate of $41.75 million.

As the MBTA Capital Program is refined and extended to 1999 and 2000, it will be possible to provide additional spending information.

Table S1–1: PMT Capital Spending by Project and Fiscal Year

	Year of Completion	Total Capital Cost ($000s)	Prior to FY 1994	FY 1994	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	Beyond FY 2000
1. Infrastructure Reinvestment											
A. Bus/Trackless Trolley	Ongoing	$189,176	$14,116	$12,526	$65,199	$60,800	$27,350	$0	▨	▨	▨
B. Commuter Rail	Ongoing	$725,999	$409,993	$54,087	$84,435	$76,908	$63,546	$37,030	▨	▨	▨
C. Blue Line	Ongoing	$519,375	$59,700	$28,005	$73,795	$89,387	$83,894	$91,358	▨	▨	▨
D. Green Line	Ongoing	$388,972	$266,163	$26,497	$27,170	$11,028	$113	$0	▨	▨	▨
E. Red Line	Ongoing	$875,198	$734,600	$68,171	$56,370	$16,057	$0	$0	▨	▨	▨
F. Orange Line	Ongoing	$131,000	$0	$0	$0	$0	$0	$0	▨	▨	▨
G. Systemwide	Ongoing	$751,515	$300,588	$84,194	$107,266	$100,891	$96,341	$62,235	▨	▨	▨
Total Infrastructure Reinvestment		$3,581,236	$1,785,161	$273,481	$414,234	$355,072	$271,244	$190,623	$300,931	$300,931	Ongoing
2. ADA Compliance											
A. Key Station Plan	2011	$242,930	$0	$4,658	$9,027	$13,440	$10,000	$10,000	$16,400	$34,600	$144,805
B. Other Red Line Access	1995	$3,563	$1,637	$1,691	$235	$0	$0	$0	$0	$0	$0
C. Other Orange Line Access	1995	$11,844	$6,601	$2,111	$3,131	$0	$0	$0	$0	$0	$0
D. Other Commuter Rail Access	1995	$2,787	$314	$1,740	$732	$0	$0	$0	$0	$0	$0
E. Green Line Vehicles	2001	$319,500	$0	$1,000	$37,000	$35,500	$32,300	$57,700	$40,000	$40,000	$76,000
F. RIDE Vehicles†	1997	$3,772	$0	$853	$710	$610	$1,600	$0	$0	$0	$0
G. Miscellaneous	1994	$5,563	$5,281	$282	$0	$0	$0	$0	$0	$0	$0
Total ADA Compliance		$589,959	$13,833	$12,336	$50,835	$49,550	$43,900	$67,700	$56,400	$74,600	$220,806
3. SIP-CA/T Mitigation Projects											
A. Old Colony Commuter Rail											
Middleborough/Plymouth	1996/1998††	$480,000	$23,539	$36,068	$144,480	$150,263	$109,557	$16,092	$0	$0	$0
Greenbush*	1996/Unk	$80,000	▨	▨	▨	▨	▨	▨	▨	▨	▨
B. Worcester Commuter Rail Extension†	1996	$80,000	$1,061	$9,300	$49,700	$20,310	$0	$0	$0	$0	$0
C. South Boston Piers Phase I	2001/2000	$355,900	$17,995	$15,930	$52,986	$107,713	$92,946	$65,173	$3,157	$0	$0
D. Washington Street Replacement**†	1994/1998	$41,750	$1,227	$974	$7,500	$12,000	$12,000	$8,050	$0	$0	$0
E. 400 New Buses*	1992/Unk	$88,000	▨	▨	▨	▨	▨	▨	▨	▨	▨
F. Expansion of Existing Park and Ride	1996/1999	$106,700	$14,457	$7,501	$9,500	$7,100	$494	$37,648	$30,000	$0	$0
G. Newburyport Commuter Rail Extension	1994/Unk	$42,800	$2,505	$3,816	$1,239	$0	$0	$0	$0	$0	$35,240
H. 2 Commuter Boat Facilities*	1995/Unk	$8,272	▨	▨	▨	▨	▨	▨	▨	▨	▨
I. Arborway Restoration/Replacement*	1997/Unk	$27-56,000	▨	▨	▨	▨	▨	▨	▨	▨	▨
Total SIP-CA/T		$1,283,422	$60,784	$73,589	$265,405	$297,386	$214,997	$126,963	$33,157	N/A	$35,240
4. Additional Expansion											
A. Commuter Rail Express Service	Unknown	$141,362	▨	▨	▨	▨	▨	▨	▨	▨	▨
B. Inner Circumferential Bus Service	Unknown	$2,350	▨	▨	▨	▨	▨	▨	▨	▨	▨
C. Additional Park & Ride Expansion	Unknown	$60,352	▨	▨	▨	▨	▨	▨	▨	▨	▨
D. New Express Bus Park and Ride	Unknown	$2,600	▨	▨	▨	▨	▨	▨	▨	▨	▨
E. Intercept Stations	Unknown	$30,100	▨	▨	▨	▨	▨	▨	▨	▨	▨
F. New Express Bus Services	Unknown	$11,046	▨	▨	▨	▨	▨	▨	▨	▨	▨
G. Downtown Bus Distribution	Unknown	$6,100	▨	▨	▨	▨	▨	▨	▨	▨	▨
Total Additional Expansion		$253,911									
TOTAL		$5,708,528	$1,859,779	$359,405	$730,474	$702,008	$530,141	$385,286	$390,487	$375,531	$256,046

▨ = No funding decision yet made.

† Total cost differs from amount listed elsewhere in PMT; see introduction to this Supplement.

†† Where two dates are given, the first is the completion date given in the SIP, the second is the currently projected completion date.

* Final decision on alternatives for these projects has not been made (see Chapter 8).

** Assumes Trackless Trolley alternative; if Light Rail is chosen, costs will be higher and completion later (see Chapter 8).

Table S1–2
Detail of Infrastructure Reinvestment Projects

	Total Capital Cost
Bus/Trackless Trolley	
Bus Procurement	$110,000,000
Bus Retrofit/Rehabilitation	61,168,599
Maintenance	8,822,837
Dudley Station	9,185,000
	$189,176,436
Commuter Rail	
Right-of-Way/Track/Signals/Communications	$36,542,367
Bridges	23,153,833
Terminals/Stations/Park-&-Ride/MOW HDQRS	66,736,885
Boston Engine Terminal	102,299,795
Vehicle Rebuild	40,243,945
Vehicle Procurement	154,820,060
Service & Inspection Facility	47,333,183
North Station Transportation Center	143,000,000
Other	111,869,166
	$725,999,234
Blue Line Modernization	
Power Upgrade	$36,640,000
Station Modernization	361,883,311
Track/Signals/Communications	49,800,836
Bridges	1,050,960
Vehicle Procurement	70,000,000
	$519,375,107
Green Line	
Power Upgrade	$73,420,904
Station Modernization	9,787,199
Right-of-Way/Track	182,901,775
Lechmere Station	58,000,000
Riverside Yard Improvements/Facility	39,187,587
Vehicle Procurement	11,374,327
Ventilation Shafts	14,300,628
	$388,972,420
Red Line	
Station Modernization	$53,929,644
Maintenance & Management Facilities	2,577,247
Ventilation Shafts	14,564,117
Power Upgrade	2,408,500
Track	635,606,724
Vehicle Procurement	153,912,107
Bridges	12,200,000
	$875,198,339
Orange Line	
Vehicle Procurement	$131,000,000
Systemwide	
Fare Collection Equipment	$137,446,194
Plant & Power Improvements	136,642,528
Tunnels	52,368,749
Bridges	57,250,965

Table S1–2 (cont.)
Detail of Infrastructure Reinvestment Projects

	Total Project Cost
Systemwide (Cont.)	
Non-Revenue Equipment Procurement	$41,327,515
ISS Program	33,428,932
Noise Mitigation	10,000,000
New Police Station	10,000,000
Operations Control Center	48,654,139
South Boston Power Plant/Cardinal Medeiros Pier	3,810,539
Other	220,585,396
	$751,514,957
Total	$3,581,236,493

Supplement 2
Impacts on the Operating Budget

Table S2 gives the projected operating cost, fare revenue, and deficit impact of each PMT project for the year in which the project is expected to be completed. Additional detail on each line item in this table is available in the main volume of the PMT in Chapters 8 and 9. Note that projects in the "Preservation of the Existing System" and "Accessibility Improvements" categories are not included in the table. In general, these two classes of projects are expected to have no significant impact on the operating budget.

In most cases, these costs and revenues were adjusted directly from the values given elsewhere in the PMT. Operating costs were inflated from 1991 dollars to the year of opening. The Consumer Price Index was used for the years between 1987 and 1993. Beyond 1993, an annual inflation rate of 3.5% was assumed.

Fare revenues were likewise inflated from 1991 dollars to the estimated year of opening. However, since most of the revenue estimates were based on ridership in the year 2020, fare revenue had to be deflated to reflect expected lower ridership levels in the years leading up to 2020. The deflation factors were derived from Appendix 2 of the Worcester Commuter Rail Draft EIR, which provides ridership growth estimates for the years 1995 to 2010. For years from 2010 to 2020, annual growth of 2.0% was assumed. (This rate is slightly lower than the annual growth rate given in the DEIR.) Thus, fare revenue for the year of opening reflects a lower level of ridership than that used to evaluate the worth of each individual project. This adjustment makes near-term projects appear less favorable, as ridership can be expected to grow substantially by 2020 for these projects, while projects expected to be completed in 2010 or later will have ridership levels near to those of 2020.

In some cases, adjustments other than those described above were necessary. Old Colony figures were adjusted from year 2000 ridership and fare revenues given in the Old Colony FEIS/R.[1] Values for the Inner Circumferential Bus alternative are based on 1992 ridership and cost calculations developed as part of the Inner Circumferential Transit study.[2] Figures for the North-South Rail Link project are for the full project (Phases I and II), which is estimated for completion in 2018. Phase I opening might be expected in about 2003. For four projects (Commuter Boat Facilities, Logan Airport Service, Needham Commuter Rail Improvements, and Green Line Improvements), operating cost and fare revenue estimates are unavailable, as the projects have not yet been sufficiently well-defined.

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[1] Old Colony Railroad Rehabilitation Project from Boston to Lakeville, Plymouth, and Scituate, Massachusetts, Final Environmental Impact Statement/Report and Section 106 Evaluation, March, 1992.

[2] Circumferential Transit Mid-Term Improvement Study, December, 1993.

Note that due to the uncertain nature of future funding, many projects in the PMT have not had construction schedules set. Projects in roman (non-italic) type are those for which construction funding is contained in the current MBTA Five-Year Capital Program. For these projects, opening dates are based on present projections of project completion. Projects in italic type are those for which construction funding has not been identified or for which final project configurations have not been determined. Opening dates for these projects are estimates based on implementation schedules given in Figure ES-5 of the Executive Summary and were assumed only for the purposes of this specific analysis. None of the dates in Table S2-1 should be construed as a commitment on the part of EOTC or the MBTA to complete a specific project in a specific year. (For additional discussion of project scheduling and the MBTA Capital Program, see Supplement 1.)

Table S2: Operating Cost and Fare Revenue Impacts of PMT Projects

Project	Estimated Opening*	Operating Cost	Fare Revenue	Net Cost (Revenue)
SIP-CA/T MITIGATION PROJECTS				
Old Colony Commuter Rail				
Phase I: Middleborough/Plymouth	1996/1997	$15,199,161	$7,468,224	$7,730,938
Phase II: Greenbush	*1996/1999*	*$6,150,000*	*$2,772,159*	*$3,377,841*
Worcester Commuter Rail	1996/1996	$8,564,073	$3,414,872	$5,149,201
South Boston Piers Transitway Phase I	2001/2000	$32,299,756	$4,770,729	$27,529,026
Washington Street Replacement				
Trackless Trolley	1994/1997	($428,204)	$0	($428,204)
Light Rail	1994/2001	($1,333,728)	$0	($1,333,728)
10,000 Parking Spaces by 1996†	1996/1997	$0	$0	$0
10,000 Parking Spaces by 1999††	*1999/1999*	*Low*	*$2,815,605*	*($2,815,605)*
Newburyport Commuter Rail	*1994/1999*	*$2,179,492*	*$1,071,141*	*$1,108,351*
Green Line to Medford Hillside	*2011/2008*	*$3,770,634*	*$1,506,050*	*$2,264,584*
Blue Line-Red Line Connector	*2011/2008*	*$893,092*	*$2,107,346*	*($1,214,254)*
Arborway Line Project				
Trackless Trolley	*1997/1999*	*($3,347,217)*	*$36,759*	*($3,383,976)*
Light Rail	*1997/2003*	*($2,231,816)*	*$24,504*	*($2,256,319)*
*Commuter Boat Facilities***	*1995/Unk*			
ADDITIONAL EXPANSION PROJECTS				
Commuter Rail Express Service				
Rockport/Ipswich	*1997*	*$1,488,925*	*$666,660*	*$822,265*
Haverhill/Reading	*1997*	*$2,846,942*	*$1,101,139*	*$1,745,804*
Lowell	*1997*	*$190,856*	*$1,079,683*	*($888,827)*
Franklin	*1997*	*$3,552,867*	*$544,822*	*$3,008,044*
Attleboro/Stoughton	*1997*	*$1,036,253*	*$210,726*	*$825,527*
Inner Circumferential Transit				
Short-term Bus	*1995*	*$2,213,888*	*$346,606*	*$1,867,282*
Core Light Rail	*2013*	*$9,971,728*	*$5,767,103*	*$4,204,625*
Full Light Rail	*2013*	*$28,086,862*	*$10,886,478*	*$17,200,384*
Additonal Expansion of Existing Park-and-Ride				
Short-term	*2003*	*Low*	*$2,172,215*	*($2,172,215)*
Long-term	*2008*	*Low*	*$3,525,505*	*($3,525,505)*

Table S2: Operating Cost and Fare Revenue Impacts of PMT Projects

Project	Estimated Opening*	Operating Cost	Fare Revenue	Net Cost (Revenue)
Express Bus Park & Ride Lots	*2003*	*Low*	*$499,661*	*(499,661)*
Intercept Stations Along Major Highways	*2005*	*Low*	*$3,353,504*	*(3,353,504)*
New/Improved Express Bus Service	*1997*	*$2,893,433*	*$1,707,263*	*$1,186,170*
Downtown Boston Bus Distribution	*1997*	*$1,547,650*	*$1,027,576*	*$520,074*
Wonderland Commuter Rail Connector	*2003*	*$693,307*	*$263,148*	*$430,159*
South Boston Piers Transitway Phase II	*2003*	*($2,397,247)*	*($42,615)*	*($2,354,632)*
North-South Rail Link Phases I& II	*2018*	*$96,335,292*	*$70,923,428*	*$25,411,864*
Route 128 Bus Service	*2003*	*$7,253,401*	*$917,288*	*$6,336,113*
Blue Line to Lynn	*2008*	*$18,310,171*	*$2,010,408*	*$16,299,763*
Red Line to Mattapan	*2013*	*$2,728,133*	*$435,388*	*$2,292,746*
New Bedford/Fall River Commuter Rail	*2008*	*$21,800,374*	*$3,718,763*	*$18,081,611*
Millis Commuter Rail	*2013*	*$11,406,508*	*$2,143,035*	*$9,263,473*
Mattapan Commuter Rail Connector	*2018*	*$256,211*	*$84,714*	*$171,497*
*Expanded Logan Airport Service***	*2008*			
*Needham Commuter Rail Improvements***	*2003*			
*Green Line Improvements***	*2003*			

Notes:

* When two dates are given, the first refers to the date given in the SIP, the second to current estimates of project completion

** Insufficient detail is available for these projects to estimate costs and revenues

† These parking spaces include those recently completed, as well as those included in the Worcester and Old Colony Phase I projects

†† These parking spaces include 2,690 expected in the Old Colony Phase II project; costs and revenues are for the additional 7,310 needed to meet the requirement

Italics indicate projects for which construction schedules are not set; completion dates are estimated from Table ES-5